

**III. Remarks**

**A. Amendments to the Claims**

Claims 10, 14, 15 and 16 have been amended to set forth the galactomannan has a polydispersity of about 2.7 or below. Support for the amendment is provided in the Specification in TABLE 4 on page 19.

**B. Response to Rejections of Claims  
under 35 U.S.C. §§ 102 and 103 over  
United States Patent No. 5,273,767 to Burgum et al.**

Claims 1–8 are rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over United States Patent No. 5,273,767 to Burgum et al.

**1. The Examiner's reasons for the rejection**

The Examiner's reasons for the rejections are as follows:

Burgum et al. teaches rapidly hydrating gums by exposing gums, such as xanthan and/or guar gum to ionizing radiation, such as electron beam radiation. The examiner is aware that the instant claims are a method of depolymerizing the polysaccharides found in claim 1 by irradiation, however Burgum et al., while not expressly teaching depolymerization, teaches the instant method of irradiation by electron beams. Burgum et al. teaches irradiating with electron beam sources emitting around 12 Mev. The amount of radiation is between 0.1 to about 4.5 Mrad. Since the method taught by Burgum et al. appears to be the same method as disclosed the examiner deems that the method of Burgum et al. inherently will depolymerize the disclosed polysaccharides to a lower molecular weight. The examiner is interpreting the limitation "pre-selected molecular weight" to mean a lower molecular weight than the un-irradiated polysaccharide used in the method since there is no metes and bounds for the term pre-selected. Thus claims 2–5 are deemed inherent to the method as described by Burgum et al. in the absence of evidence to the contrary and/or unexpected results.

(Examiner's Action, Paragraph 3, page 3, lines 9–24).

**2. Comparison between Applicants' claimed subject matter  
and Burgum et al.**

Applicants' method as claimed in claim 1 is a method of depolymerizing polysaccharides selected from the group consisting of galactomannans, modified galactomannans and xanthan to a preselected molecular weight comprising the step of the subjecting the polysaccharides to radiation consisting essentially of electron beams. Claims 2–5 further limit the method to

provide that the galactomannans are depolymerized to defined molecular weights of, for example, "less than about 700,000 Daltons" (Claim 2) to a molecular weight of between about 100,000 Daltons and about 250,000 Daltons" (Claim 5). Claims 6 and 8 are directed to species of galactomannans, and claim 7 is to a galactomannan produced according to the method of claim 1.

As noted above, the Examiner's reasons in support of the rejection include the following statement about Burgum et al.:

The examiner is aware that the instant claims are a method of depolymerizing the polysaccharides found in claim 1 by irradiation, however Burgum et al., while not expressly teaching depolymerization teaches the instant method of irradiation by electron beams.

(Examiner's Action, Paragraph 3, page 3, lines 11–14).

Applicants agree with the Examiner's conclusion that Burgum et al. does not expressly teach depolymerization. In fact, Burgum et al. does not contain any teaching, disclosure, exemplification or suggestion of depolymerization, let alone Applicants' claimed method of depolymerizing polysaccharides to a preselected molecular weight, in particular, the molecular weights as defined in claims 2–5.

**3. Legal standards for rejections of claims under 35 U.S.C. §§ 102 and 103**

Under Section 2131 of the Manual of Patent Examining Procedure, "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Brothers v. Union Oil Co. of California*, 814 F.2d 628, 631 2USPQ2d 1051, 1053 (Fed. Cir. 1987). As acknowledged by the Examiner, the method claimed in claims 1–6 and 8 and the article claimed in claim 7 are not expressly described in Burgum et al. Instead, the method is believed to be inherently described because of Burgum et al.'s disclosure of the formation of rapidly hydrating gums by exposing gums such as xanthan and/or guar gum to ionizing radiation such as electron beam radiation. The further limitations set forth in Applicants' claims 2–5, regarding a specified molecular weight, are deemed inherent to the method as described in Burgum et al.

With respect to rejections of claims under 35 U.S.C. § 102 on the basis of inherence, Federal Circuit decisions emphasize that an anticipatory inherent feature or result must be consistent, necessary and inevitable, not merely possible or probable. *In re Robinson*, 169 F.3d 743, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999) (United States Patent and Trademark Office

Board of Patent Appeals and Interferences erred in holding that a prior art reference anticipated by inherency in applicant's claim, which concerned a diaper fastening and disposal system; "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient"). As noted above, the Burgum et al. method is used to accomplish a different result than is Applicants' claimed method. *W.L. Gore & Associates, Inc., v. Garlock, Inc.*, 721 F.2d 1540, 1554 220 USPQ 303, 314 (Fed. Cir. 1983), appeal after remand 842 F.2d 1275, 6 USPQ2d 1277 (Fed. Cir. 1988) ("anticipation of invention set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of products that might result from the practice of processes disclosed in references"). As noted above, the Burgum et al. disclosure provides no suggestion of Applicants' claimed method of depolymerizing galactomannans to a preselected molecular weight, let alone the specific molecular weight set forth in claims 2–5. Thus, attempting to derive from the disclosure set forth in Burgum et al. Applicants' claimed method to come within the characterization of "mere conjecture" rejected by the Federal Circuit as a basis for anticipation through inherency.

Accordingly, for the reasons set forth above, the rejection of claims 1–8 under 35 U.S.C. § 102(b) as anticipated by Burgum et al. should be withdrawn.

Under Section 2142 of the Manual of Patent Examining Procedure, "to establish a *prima facie* case of obviousness, three basic criteria must be met. . . . Finally, the prior art reference (or references when combined) must teach or suggest all the claimed limitations. The teaching or suggestion to make the claimed combination and a reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991). As noted above, the teaching to make the method as claimed in Applicants' claims 1–6 and 8 that galactomannan of Applicants' claim 7 are not found in Burgum et al. Burgum et al. also does not in any manner suggest Applicants' claimed method or the galactomannan produced by the claimed method. As Burgum et al. does not teach or suggest all of the limitations set forth in Applicants' claims 1–8, a *prima facie* case of obviousness of claims 1–8 over Burgum et al. has not been established. Accordingly, the rejection of claims 1–8 under 35 U.S.C. § 103 as unpatentable over Burgum et al. should be withdrawn.

**C. Response to Rejection of claims 10–12 and 14–16 under 35 U.S.C. § 103 as unpatentable over United States Patent No. 4,505,826 to Horton in view of United States Patent No. 6,884,884 to Magallanes et al.**

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Claims 10–12 and 14–16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 4,505,826 to Horton in view of United States Patent No. 6,884,884 to Magallanes et al.

**1. The Examiner's reasons in support of the rejection**

Horton teaches prepackaged crosslinked polymers capable upon hydration for use usage [*sic*] as a fracturing fluid. Said mixture includes a polysaccharide, a crosslinking agent and a pH-adjusting agent to facilitate the crosslinking reaction. Said mix is hydrated while being pumped and reaches maximum viscosity in the formation, such as an oil well. It is taught that the gelling composition is a solvatable polysaccharide having a molecular weight of at least about 100,000 and include[s] those polysaccharides found in column 3, line 55 to column 4, line 5. Said crosslinking agents contain polyvalent metal ions and is most preferably zirconium acetal acetonate. This anticipates at least one crosslinking agent in claim 11. Horton teaches propping agents, such as sand bauxite and other particulate materials can be added to the dry mixture. Said dry mix is added to an aqueous stream as it is pumped into the well, where rapid hydration is facilitated by the turbulence of the material in the bore well. Per example 13, Horton teaches hydration takes place within less than 30 seconds.

Horton does not expressly teach a galactomannan having polydispersity of below 3.0. However oil well fracturing agents using galactomannan having a polydispersity from 1–8 are known, such as found in Magallanes et al. Magallanes et al. teaches methods of depolymerizing galactomannan and derivatives thereof and uses of such compounds. Magallanes et al. teaches said depolymerized compounds make unexpectedly better fluids for treating and/or making subterranean fractures, such as by increasing the conductivity of liquids and materials through the use of a proppant pack — see column 6, lines 58–62. Per table 2, Magallanes et al. teaches a sample 293H that has a polydispersity of 2.97.

Horton and Magallanes et al. are analogous are because they are from the same field of endeavor[,] that is the art of fracturing compositions. Therefore, it would have been obvious for an artisan of ordinary skill in the art to modify the invention of Horton with the depolymerized galactomannan of Magallanes et al. The motivation would have been a reasonable expectation of successfully obtaining the advantages of the fracturing composition as taught by Magallanes et al. — see column 6, lines 58–62.

(Examiner's Action, Paragraph 5, page 4, line 7 to page 5, line 5).

**2. Comparison between the subject matter of Applicants' claims and the Horton and Magallanes et al. patents**

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Claims 10–12 and 14–16 are directed to an oil well fracturing agent, said agent comprising an additive and a galactomannan, which is crosslinkable with said additive and has a molecular weight of between about 100,000 Daltons and about 250,000 Daltons. The galactomannan also has a polydispersity of below about 2.7 and is at least 90% hydrated within three minutes.

The Examiner has relied upon Magallanes et al. as disclosing a polydispersity of 2.97, citing lot number 293H in Table 2. The sixteen remaining lot numbers in Table 2 have polydispersity indices of between 3.46 and 6.55. As noted under Example 2, the hydroxypropyl guar identified by lot numbers in Table 2 is depolymerized with hydrogen peroxide (Column 8, line 7 to column 9, line 63). Applicants disclose in the application at Paragraph [006] that “hydrogen peroxide treatment generally produces depolymerized guar gums having a polydispersity of between 3 and 5, which is too high.” Applicants further disclose that the depolymerized guar gum used in oil well production should have a polydispersity value of no greater than about 3.0. Applicants’ pending claims 10–12 and 14–16 are directed to a preferred embodiment, namely galactomannans which have a polydispersity of below about 2.7.

**3. Legal standard for a showing of *prima facie* obviousness**

As noted hereabove, Section 2142 of the Manual of Patent Examining Procedure provides that “to establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claimed limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant’s disclosure. *In re Vaeck*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In the Action, the Examiner acknowledges that “Horton does not expressly teach a galactomannan having a polydispersity of below 3.0.” Magallanes et al. does not exemplify the preparation of any specific galactomannans that have a polydispersity of below 2.97. Accordingly, the oil well fracturing agent set forth in Applicants’ claims 10–12 and 14–16, which comprise a galactomannan having a polydispersity of about 2.7 or below, is not taught or suggested in a manner having a reasonable expectation of success in Horton or Magallanes et al. As a result, a *prima facie* case of obviousness of claims 10–12 and 14–16 is not established on the basis of Horton in view of Magallanes et al.

For the reasons forth above, the rejection of claims 10–12 and 14–16 under 35 U.S.C. § 103(a) as being unpatentable over Horton in view of Magallanes et al. should be withdrawn.

**IV. CONCLUSION**

It is believed that the above Amendment and Remarks constitute a complete response under 37 CFR § 1.111 and that all bases of rejection in the Examiner's Action have been adequately rebutted or overcome. A Notice of Allowance in the next Office Action is, therefore, respectfully requested. The Examiner is requested to telephone the undersigned attorney if any matter that can be expected to be resolved in a telephone interview is believed to impede the allowance of the pending claims still at issue (claims 1–8, 10–12 and 14–16) in United States Patent Application Serial No. 10/606,256.

Respectfully submitted,

**PAUL & PAUL**

*John S. Child, Jr.*  
John S. Child, Jr.  
Registration No. 28, 833  
Suite 2900  
2000 Market Street  
Philadelphia, PA 19103-3299  
Telephone: 215-568-4900  
Facsimile: 215-567-5057

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SEND ALL CORRESPONDENCE TO:  
Customer Number 27-569  
Paul & Paul  
2000 Market Street  
Suite 2900  
Philadelphia, PA 19103-3229